Evaluation of Midwifery Care: A Case Study of Rural Guatemala

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Introduction

Of the nearly 600,000 women who die each year due to pregnancy-related causes, over 99 percent live in developing countries (WHO and UNICEF, 1996). An additional 50 million women in developing countries experience a pregnancy-related complication each year (NRC, 1997). These numbers reflect huge disparities in maternal morbidity and mortality between developing and industrialized countries, with rates in the former countries reaching values 100 times as large as those in the latter (Walsh et al., 1993).

Leedham (1985) estimates that between 60 and 80 percent of births in developing countries are attended by midwives or traditional birth attendants,[1] who are frequently the primary or sole providers of maternal health care (Levitt and Minden, 1995). More recent estimates indicate that about half of births in the developing world are attended by a person with no formal or professional training (WHO, 1997). Obstetrical care is neither affordable nor accessible to the vast majority of women in these countries. Thus, it is not surprising that governments and international agencies attempting to reduce international disparities in maternal mortality and morbidity have focussed many of their efforts on traditional birth attendants (TBAs).

In the early 1970s, the World Health Organization began to promote the integration of TBAs within the maternity care system and encouraged countries to offer training programs for TBAs who would serve as extensions of government-sponsored maternal and child health services (Leedam, 1985). More recently, the Safe Motherhood Initiative was developed in response to the persistence of high rates of maternal mortality and morbidity in the developing world and the concentration of biomedical health services in major urban areas. The underlying premise of this and similar initiatives has been that most infant and maternal deaths and disabilities are preventable through high quality and accessible prenatal care services, detection and efficient referral for complications, the assistance of a trained birth attendant, and effective access to the essential elements of obstetric care if needed (Mahler, 1987; Safe Motherhood IAG, 2000). Although nearly 30 years have passed since WHO first recommended the integration of midwives into the maternal health care system, our knowledge of the extent to which the quality and accessibility of services in poor countries have improved is extremely limited in many parts of the developing world.

In this paper, we examine the content of pregnancy-related care in one Central American country, Guatemala, a country characterized by some of the highest maternal and infant mortality rates in Latin America. The most recent estimates indicate a maternal mortality rate of 190 per 100,000 live births and an infant mortality rate of 43 per 1,000 (World Bank, 1999). The government of Guatemala has had formal association with midwives for decades, having introduced licensing arrangements for midwives as early as 1935 and having initiated training

[1] The label "traditional birth attendant" (TBA) has been criticized as being ethnocentric and medicocentric and imposed by outsiders in a way that devalues local forms of knowledge (Cosminsky, forthcoming; Pigg, 1995). Although we occasionally use the term TBA, we prefer the term midwife, which is the direct translation of the Guatemalan title "*comadrona*."

programs in 1955, although little action was taken for several decades. In the 1980s, the Guatemalan Ministry of Health adopted WHO recommendations toward the formal recognition of midwives and their integration into the national health care system (Acevedo and Hurtado, 1997; Leedam, 1985). A report in the late 1980s (Putney and Smith, 1989) indicates that about 70 percent of the approximately 20,000 midwives in Guatemala received training, a statistic that suggests that the training programs have been widespread. On the other hand, there has been frequent criticism of the quality of the midwife training programs in Guatemala (Cosminsky, 1982; Greenberg, 1982; Putney and Smith, 1989; Lang and Elkin,1997; Hurtado and Saenz de Tejada, forthcoming). In addition, in spite of increased use of government health services and private doctors and nurses, utilization of these biomedical services for pregnancy-related care in Guatemala continues to be low relative to other Latin American countries, and midwives remain the major provider of pregnancy and delivery care, especially in rural areas and among the indigenous (INE et al., 1996; Pebley et al., 1996).

Unfortunately, apart from several small-scale evaluation studies,[2] there is little information on the degree to which midwives have been integrated effectively into the formal health care system. More generally, there is a dearth of research on the quality of the pregnancy-related care that midwives (or other providers) offer in Guatemala. This limitation is not restricted to Guatemala but rather reflects a general lack of knowledge about the quality of prenatal care even in the industrialized world. Most of the literature attempting to evaluate the adequacy of prenatal care has been based on measures of the timing and frequency of visits to providers, not on the actual content of services, although there is no evidence that the amount of care is a major determinant of birth outcomes (Petitti et al., 1991; Stringer, 1998). The scarcity of research in this area probably results in large part from the absence of uniform criteria with which to assess such care. Guidelines regarding care and practices during pregnancy are often not consistent across countries, even among more developed countries, and frequently reflect "expert opinion" or published standards rather than scientific evidence (Enkin et al., 1995; Haertsch et al., 1999; Rooks, 1999). The few studies that have examined content of care are limited not only by the lack of standard evaluation criteria, but also by the inappropriateness of most of these criteria for developing countries where the majority of births occur at home, attended by a midwife with little formal training.

The objective of the present analysis is to describe and evaluate several aspects of pregnancy-related care in Guatemala, based on a large-scale sample survey —the 1995 *Encuesta Guatemalteca de Salud Familiar* (EGSF), or the Guatemalan Survey of Family Health. As described in more detail below, these data are derived from structured interviews with women of reproductive age and with traditional and biomedical providers in 60 rural communities in Guatemala. This survey was not designed for an evaluation of midwife training programs or for an assessment of changes in treatment behavior over time. Nevertheless, the availability of data from randomly selected samples of women and providers in diverse geographic areas of Guatemala permits us to quantify several important dimensions of the integration of traditional

[2] For example, the Mothercare project implemented a training program for midwives in four departments in the Western Highlands, and subsequently evaluated its effect on such outcomes as the frequency of midwife referrals, and midwives' ability to recognize signs of complications (Hurtado and Saenz de Tejada, forthcoming).

and biomedical services and to move beyond existing studies in an effort to evaluate the quality of pregnancy-related care.

In the next section of the paper, we briefly describe the social context, the nature of the health care system, and the content of midwife training programs in Guatemala. Subsequently, we discuss the detailed objectives of the analysis. Next, we describe the data collected as part of the EGSF, explore the availability of different providers who offer care during pregnancy and the characteristics of midwives, and discuss our analytical procedures. In the final two sections, we present the results and consider the implications of our findings.

Background

Social Context in Guatemala

Guatemala is one of the poorest countries in Latin America and one of the most stratified in the world, with the vast majority of the population living below the poverty line. A small elite controls much of the land and the economy and retains political power. A majority of the rural population does not have adequate access to such public services as water, sanitation, and electricity (Steele, 1994).

The population is divided into two ethnic groups of roughly equal size: the indigenous population, who are descendants of Mayas and other pre-conquest groups and may speak only a Mayan language, and ladinos, who are of both indigenous and European origins, speak Spanish, and view themselves as part of the mainstream Guatemalan culture. Ethnicity is closely tied to social class: the indigenous population is, with few exceptions, poor, while ladinos are members of all social classes.

Health Care System

The health care system in Guatemala has frequently been characterized as *pluralistic*, because of the coexistence and concurrent use of traditional, biomedical and popular practitioners (Cosminsky and Scrimshaw, 1980; Pebley et al., 1996). In recent years, the distinction among these types of providers has become increasingly blurred as traditional practitioners have adopted biomedical practices and Western pharmaceuticals (van der Geest and Whyte, 1988).

Pregnancy-related care in Guatemala is most commonly provided by midwives, who are typically highly respected within their communities. Since pre-Hispanic times, midwives have offered women care during pregnancy, delivery and the postpartum period. They have been regarded as both ritual and obstetrical specialists, although, with the introduction of the training programs, the former of these two roles has been weakened (Paul, 1975; Cosminsky, 1982; Hurtado and Saenz de Tejada, forthcoming). However, pregnant women have been increasingly seeking biomedical care – often while continuing to visit the midwife. Biomedical care consists

of services from government-supported health centers or posts,[3] which provide care for free or at a nominal cost, or less frequently, from private doctors. Doctors, and especially hospitals, tend to be concentrated in urban areas. Whereas government-run hospitals provide delivery services without cost, private hospitals tend to be very expensive. Overall, Guatemala has the institutional capacity to provide formal medical services for only 20 percent of birthing women (Schieber and Delgado, 1993).

Midwife Training Programs

Training programs for midwives in Guatemala began in 1955 and have been modified several times since that date. Midwives who have not received formal training are legally prohibited from practicing (Cosminsky, forthcoming; Greenberg, 1982), although untrained midwives continue to do so (Hurtado and Saenz de Tejada, forthcoming). The current training program carried out by the Ministry of Health lasts for 15 days (eight hours per day) and is taught by a nurse with at least one-year of nursing education.[4] Training programs are designed to teach midwives about general hygiene and preventive care, to encourage midwives to send all pregnant women to the health center or post for tetanus vaccination, prenatal examinations, and postpartum follow-up, and to instruct midwives to recognize and refer high-risk women and those with complications to a doctor or hospital (Cosminsky, 1977; Putney and Smith, 1989). As part of these efforts, training programs frequently condemn traditional practices (such as use of the sweatbath, massage, and herbal remedies) and may encourage the adoption of biomedical ones in their place (Cosminsky, 1982; Greenberg, 1982; Putney and Smith, 1989). Additional training may be available for midwives who have already received the basic course such as monthly meetings at the health center and a three-day retraining course subject to available funding (Lang and Elkin, 1997). Besides training offered by the Ministry of Health, non-governmental and international agencies have conducted training programs.

Many criticisms have been targeted at the midwife training programs (Cosminsky, 1982; Greenberg, 1982; Putney and Smith, 1989; Lang and Elkin,1997). The programs have been considered didactic, tedious, unnecessarily complicated, and inappropriate for older, frequently illiterate, rural women. In addition, the nurses teaching the material are often considered inadequately trained themselves, are typically unable to speak indigenous languages, and are frequently condescending to the midwives. Observers of these programs also lament the training programs' reliance on Western, urban models of training that (1) use culturally inappropriate teaching methods; (2) advocate the use of procedures that are impractical in the midwives' environment, particularly for home deliveries (e.g., sterilization of scissors via boiling); and (3) discourage, or sometimes condemn, traditional practices that are unlikely to have negative effects and may well have beneficial ones (e.g., delivery in an upright rather than supine position and cauterization of the umbilical cord in lieu of sterilization of scissors). The effectiveness of the retraining sessions has also been brought into question (Putney and Smith, 1989).

[3] Health centers are located in municipal capitals, are typically directed by a doctor, and sometimes have in-patient facilities. In contrast, health posts are located in small communities, are usually managed by an auxiliary nurse, rural health technician or medical student, and offer fairly limited services.

[4] Although professional nurses are officially responsible for training, most training has been the responsibility of auxiliary nurses who have little experience in delivery (Hurtado and Saenz de Tejada, forthcoming).

The practices used by midwives may be changing not only as a consequence of the training process, but more generally as a result of the increasing biomedicalization of health care in Guatemala. The widespread prevalence and accessibility of Western pharmaceuticals has led to frequent use of modern medicines among traditional practitioners in Guatemala (Heuveline and Goldman, 2000), sometimes with serious consequences. For example, the availability of oxytocin for injection from Guatemalan pharmacies has made it easy for midwives to administer these injections to speed the delivery process, often at the pregnant woman's request. Intramuscular injection of oxytocin during labor has been shown to be associated with increased risks of fetal and neonatal deaths and maternal complications (WHO, 1996; Bartlett et al.,1993; Putney and Smith, 1989). Some analysts fear that the poor quality of the training programs, combined with the proliferation of Western pharmaceuticals among traditional providers and the replacement of potentially beneficial traditional practices with less favorable ones, may result in worse – rather than improved – reproductive outcomes for Guatemalan children and women (Putney and Smith, 1989).

Objectives

In this analysis, we focus on four aspects of integration between midwives and the formal health care system that are likely to reflect the quality of care received by Guatemalan women. We begin by exploring the coexistence of traditional and biomedical health care during pregnancy and the postpartum period. Specifically, we examine the extent to which women combine these two types of care, rather than rely solely or primarily on one. Although previous research indicates that women frequently do combine traditional and biomedical pregnancy-related care (Glei and Goldman, 2000; INCAP, 1997a), some studies suggest that many of these women visit the health centers or posts only once during pregnancy and that women often receive no postpartum care whatsoever (Acevedo and Hurtado, 1997; INCAP, 1997a).

As noted above, midwives are strongly encouraged during training to send their clients to the biomedical health system so that the latter can complement the prenatal care provided by midwives and handle complications that develop during pregnancy, delivery or the postpartum period. Estimates obtained from the first part of the analysis offer only indirect evidence of whether such collaboration between midwives and the biomedical health system exists because these estimates partly reflect women's own desires to seek biomedical care and because some women choose to ignore midwives' recommendations. In the second stage of the analysis, we examine the referral system directly by estimating the degree to which midwives report that they refer pregnant women to other providers and by examining the types of providers mentioned. Subsequently, we evaluate whether midwives who received training are more likely to make these referrals as compared with their untrained counterparts and identify characteristics of the midwife and the community that are associated with the likelihood of a midwife referring patients to the biomedical health care system.

In the remainder of the analysis, we examine the content of pregnancy-related care provided by midwives in an effort to assess the consequences of increasing biomedicalization of care and the effect of midwife training programs. In the third stage, we estimate the frequency with which midwives perform various pregnancy-related practices and offer advice on matters

related to prenatal care. Here, we focus on practices considered either beneficial or harmful (for the mother, fetus, or infant) according to current scientific evidence. Wherever possible, we compare these estimates with those obtained from ethnographic or small-scale studies in order to infer plausible changes over time in midwifery practice. In the fourth and final part of the analysis, we construct an index of the quality of care based on the practices previously identified as either beneficial or harmful. In a similar procedure to that used for the analysis of referrals described above, we evaluate whether midwives who received training offer higher quality care as compared with untrained midwives and identify characteristics of the midwife and the community that are associated with the quality of care.

Data and Methods

The 1995 Guatemalan Survey of Family Health

As noted earlier, the data for this study come from the 1995 EGSF. Interviews were conducted with 2,872 women aged 18 to 35 in 60 small, rural communities (i.e., between 200 and 10,000 inhabitants). Approximately 50 women were administered questionnaires in 15 communities in each of four departments of Guatemala, which were selected on the basis of social, economic, and environmental diversity, and ethnic composition. One department is primarily ladino (Jalapa), two are predominantly indigenous (Chimaltenango and Totonicapán), and one has a mixed population (Suchitepéquez). Communities were selected with probability proportional to population size to yield self-weighting samples within departments. Versions of the questionnaire were fielded in Spanish, K'iche', and Kaqchikel. The overall non-response rate was 11 percent.

An innovative calendar design was used to collect detailed information on pregnancy-related care and complications. For each of the last two live births that occurred since January, 1990—a total of 3,350 births to 2,020 women—respondents were asked about complications experienced and persons seen during each month of pregnancy. For each provider mentioned, the respondent was asked why she saw the provider, how many times during pregnancy she visited him or her, and whether the provider checked the baby's position, took the woman's blood pressure, drew blood, gave her an injection, or gave her a prescription, medicine, or remedy. Finally, the respondent was asked where she gave birth, who attended the birth, whether she was given an injection during birth, the purpose of the injection, whether she and the baby saw a provider in the first 40 days after the birth, and various questions concerning her breastfeeding practices during and after the first week of the infant's life.

In addition to these interviews with individual women, community informants and providers were interviewed in each community. Three community informants (the mayor, a woman in a leadership position, and another person not in a leadership position but who knew the community well) provided information about the community and a listing of health providers and facilities within a 20-km radius of the community. These listings were consolidated to construct a census of health providers and facilities for each community (see Peterson et al., 1997 for details). Subsequently, five types of providers were randomly selected from each community and interviewed: the person in charge of the health center or post nearest the community, a private doctor, a midwife, and two other providers, including traditional

practitioners, such as curers, herbalists, spiritists, and others. The community and provider questionnaires were administered only in Spanish.

As part of the provider survey, 66 midwives were interviewed. The questionnaire includes information about the midwife herself, her facilities, the clients she serves, and payment practices. Additional questions pertain to whether the midwife refers women to other providers for prenatal care or problems during pregnancy or delivery and to whether she uses or offers each of a list of specific practices and types of advice during pregnancy and birth. The questions regarding referrals and practices are worded in terms of the frequency with which the midwife performs the particular practice (e.g., normally, sometimes, only when necessary, or never).

A Description of Availability and Content of Care

Data obtained from the census of providers and provider interviews permit us to estimate the availability and cost of pregnancy-related health services, based on the 60 communities included in the EGSF. As shown in Table 1, all communities have a midwife nearby and virtually all have one within the community itself. On the other hand, biomedical services are far less accessible: for example, only about 40 percent of communities have a center or post and about one-fifth have a private physician that serves pregnant women. Only about half of the communities have a private doctor within an hour's travel time.[5] Hospitals are even more inaccessible. Overall, nearly half of the communities do not even have a single biomedical provider or facility.[6] In addition, costs vary enormously by type of care, with charges for several prenatal visits and delivery care being about ten times as high for doctors as compared with midwives (Table 2). These charges may seem moderate by developed countries' standards – e.g., about 350 quetzals[7] or $70 for a delivery performed by a doctor. However, they need to be considered in terms of the very low incomes of rural Guatemalans – e.g., average monthly household consumption of about 146 quetzals or $29, as estimated from detailed consumption and expenditure information in the EGSF. Given the difficulty that many families have in obtaining cash at short notice, it is important to recognize that more than three-quarters of midwives accept payment in kind for patients who do not have money and more than half of private doctors do not charge these patients.

Table 3 presents a summary of characteristics of the midwives interviewed in the EGSF provider survey. The estimates indicate that about three-fourths of the midwives in these communities have attended a training course related to midwifery, pregnancy, or birth.[8] As noted elsewhere (e.g., Cosminsky, forthcoming; Lang and Elkin, 1997; Putney and Smith, 1989), relatively few of these midwives came to their position by formal training and most have not had

[5] Travel time was determined by selecting the most accessible mode of transport reported among the key informants and averaging the responses regarding travel time for that mode of transport.

[6] This estimate excludes pharmacies because pharmacies offer little in terms of pregnancy care.

[7] Guatemalan currency is the quetzal, abbreviated as Q. At the time of the 1995 EGSF, the exchange rate was approximately five quetzals to the U.S. dollar.

[8] In the individual interviews, women who reported seeing a midwife were probed as to whether the midwife was trained – i.e., whether the midwife was a "comadrona empirica" or a "comadrona adiestrada." Mothers' responses (based on 2,829 births) yield an estimate of 94 percent of midwives trained. However, this estimate is likely to be unreliable because many women may not know the status of their midwife or may want to believe (or report to the interviewer) that their midwife is trained.

any schooling; rather, the majority of these women became midwives by experience (e.g., having performed these services when necessary) or by divine calling. The estimates in Table 3 also confirm findings in earlier ethnographic studies (Cosminsky and Scrimshaw, 1980; Cosminsky, forthcoming) that midwives frequently occupy multiple provider roles. Nonetheless, the midwife's work is generally not full-time; for example, during the week prior to the survey, midwives spent about 10 hours on average treating pregnant women or sick patients.

Analytical Strategy

The estimates presented in the remainder of the paper are derived from interviews with mothers and midwives. Measures of patterns of care during pregnancy, delivery and the postpartum period are derived from interviews with mothers and are based on the 3,350 infants born between January, 1990, and the time of interview. Results pertaining to midwife practices are derived primarily from the 66 interviews with midwives. However, additional estimates pertaining to midwife practices are derived from the interviews with mothers. The latter estimates permit us to validate midwives' reports and provide information on procedures not included in the midwife survey. Finally, estimates related to referrals and measures of the quality of care are derived only from the interviews with midwives. Because the sampling plan is not representative of the national population (but rather the rural population in each of the four selected departments), we have not weighted the estimates by department; however, we have included a set of dummy variables to represent the four departments in each of the statistical models described below (Peterson et al., 1997).

Standard multivariate techniques are used to assess the impact of the training status of midwives on two outcome variables: (1) whether the midwife (frequently or always) refers women to a biomedical provider; and (2) a measure of the quality of midwife care (discussed below). In the case of the former dichotomous variable, logistic models are estimated, whereas for the latter variable (which assumes values between 0 and 10), ordinary linear regression models are used. Given the limited sample size (66), the models include only a small set of explanatory variables. In addition to variables denoting the departments, these variables include several characteristics of the midwife, as well as several characteristics of the community that pertain to its socioeconomic level, remoteness, and access to biomedical care.

Our measure of quality of care is derived from an assessment of the potential benefit or harm of each of the practices and forms of advice reported by midwives in the EGSF (see Table 8 for a list of these practices). The assessments were based on scientific evidence of the potential effects of these practices as well as their appropriateness given midwives' training and the circumstances under which they practice in rural Guatemala. In many cases, we were unable to classify the procedures as either harmful or beneficial because we lacked sufficiently detailed information from the EGSF regarding the practice. For example, whereas one might classify the practice of midwives giving women advice about food as beneficial, we have no information as to the content of the advice – e.g., whether it comprises recommendations to eat nutritious types of food or whether it consists of proscriptions based on the hot-cold etiology.[9] Similarly,

[9] Other data from this project, including a set of qualitative interviews, suggest that the advice is more likely to relate to eating well rather than to food proscriptions (Acevedo and Hurtado, 1997). For example, midwives in the EGSF were asked an open-ended question regarding the most important thing that should be done in taking care of a

although one might consider the taking of blood pressure as an essential component of care in developed countries (e.g., to detect preeclampsia or eclampsia), we have no information from the survey to indicate whether midwives know how to take a blood pressure reading or to evaluate the result.[10] We also were unable to classify several procedures because of lack of scientific data regarding the practice. For example, there is inconclusive or insufficient information in the scientific literature regarding the potential benefits or harm associated with herbal remedies, massage, sweatbath, or binding the woman's stomach after delivery[11] (Cosminsky, 1977, 1982; Enkin et al., 1995; Putney & Smith, 1989).

In total, we identified 10 practices that are likely to be harmful or beneficial.[12] Six of these we classify as potentially harmful: (1) ever giving an injection to speed delivery; (2) ever giving antibiotics during pregnancy or delivery[13]; (3) ever putting powder or ointment on the umbilical cord; (4) normally pushing on the stomach at the beginning of delivery; (5) normally performing a vaginal examination during pregnancy; and (6) normally telling the mother to give the baby sugar water or tea in the first week of life (Bartlett & Paz de Bocaletti, 1991; Bartlett et al., 1993; Goer, 1995; Liskin, 1992; Okeke, 1999; Safe Motherhood, 1998; WHO, 1994; WHO, 1998; Williams and Heymann, 1998). We consider the remaining four items as beneficial: (1) normally keeping the baby warm after birth; (2) normally encouraging breastfeeding; (3) normally encouraging immunization; and (4) normally checking the mother and baby during the postpartum period (Enkin et al., 1995; Safe Motherhood, 1998; WHO, 1994; WHO, 1996).

In order to derive a measure of the quality of care, these 10 practices were scored so that higher values reflect a greater number of harmful practices: i.e., a midwife received a point for each harmful practice in which she engages and a point for each beneficial item that she fails to practice. The scores were summed to create a summary score or an index of quality of care, with a potential range from 0 to 10.[14] We also explored some alternative procedures for the creation of an index – e.g., weighting "more dangerous" procedures more heavily – but recognized the arbitrariness inherent in any choice of weights. Nevertheless, we repeated the analysis presented here under several distinct rules for creating the indices (e.g., giving little weight to or dropping

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women during pregnancy and delivery. The most common response was that the mother should eat well – e.g., consume products with sufficient vitamins and nutrients.

[10] Midwives are not taught to take blood pressure readings, nor are they given blood pressure cuffs. Two other procedures in this category are examining the position of the baby and trying to change the position (e.g. by external cephalic version). The former procedure can enable the midwife to detect malpresentation, while the latter, if done successfully at term (37 weeks or more), may avoid the need for a cesarean delivery (Jordan, 1993; Goer, 1995; Enkin et al., 1995).

[11] Among indigenous people, it is customary to bathe in a sauna-like sweatbath (*temascal*) during pregnancy and after birth. Binding the stomach is another common practice used after the birth. Because the bones of the birth canal are believed to open when the child is born, the midwife massages the abdomen and ties an abdominal binder (*faja*) below the navel to close the bones and prevent uterine prolapse (Cosminsky, 1982).

[12] Practices considered to be beneficial were coded as such if the midwife reported that she *normally* performs them. Practices considered harmful under any circumstance were coded as such if the midwife reported that she *ever* uses them. Practices that may be appropriate under certain circumstances but harmful in others (e.g., vaginal exam, pushing on the stomach and supplemental feeding) were classified as harmful only if the midwife reported that she performs them *normally*.

[13] We consider the use of antibiotics by midwives harmful because these drugs should not be administered by persons without medical training.

[14] In one of the few studies that evaluates different facets of prenatal care, Petitti et al. (1991) employ the same type of index – i.e., their index is calculated as the sum of eight components of recommended prenatal care.

several measures from the index) and found that our results were robust to these alternative specifications.

Results

Patterns of Care

Table 4 presents distributions of care pertaining to pregnancy, delivery and the postpartum period. The data reveal that in almost all pregnancies (96 percent), women obtain some form of prenatal care.[15] As suggested by earlier research, the midwife is the most frequently sought provider at all stages of a pregnancy and birth and most deliveries occur at home. In about 28 percent of pregnancies, women rely on both the midwife and a biomedical provider during pregnancy – most commonly a government health center or post – and in about 11 percent of pregnancies, they use only a biomedical provider. Thus, although biomedical care is most commonly used in conjunction with a midwife rather than on its own, it seems that the majority of women seeing a midwife either are not told to seek biomedical care or they fail to heed the recommendation when offered. During the postpartum period, virtually no women combine care from a midwife and a biomedical provider, and in a substantial fraction of births (29 percent), women do not see any provider at all.

The estimates in Table 5 refute earlier research indicating that women who visit a government facility or a doctor during pregnancy in addition to a midwife (28% of sample births), typically do so only once. For example, our results demonstrate that, for pregnancies in which women combine care from a midwife and a health center or post, women visit the latter 4.5 times on average – a value below the 6.4 visits made on average to the midwife but considerably higher than commonly assumed. It also appears that women who seek biomedical health care in addition to care from the midwife (1) visit the latter about as often (six times on average) as women who see only the midwife; (2) visit the biomedical provider only slightly less frequently than those who see only the biomedical provider; and (3) make more visits in total than those who see only one type of provider. Estimates derived from the sample of births indicate that women who see a provider during pregnancy make an average of eight prenatal visits.

Referrals

Results pertaining to referrals by midwives are presented in Table 6. Overall, 80 percent of midwives interviewed indicate that they do – at least on occasion – make referrals to another provider for prenatal care or for problems during pregnancy; one-third of midwives make referrals on a regular basis (i.e., frequently or always). During the prenatal period, midwives most often refer to the health center or post, whereas for problems at the time of birth, they refer most frequently to the hospital. Referrals to other midwives are rare.

A simple comparison between midwives who received training and those who did not indicates that the former group is more likely than the latter to refer patients to a biomedical

[15] In all analyses based on the mother's report, the birth is the unit of analysis rather than the mother. One mother may contribute two births.

provider or facility on a regular basis:[16] 38 percent versus 12 percent ($p<0.06$, data not shown). In Table 7, we explore whether these results persist in a simple logistic regression model, once we control for other characteristics hypothesized to affect the likelihood that the midwife makes referrals.

In addition to dummy variables for the department of residence, the model of referrals includes six explanatory variables. Three of these denote characteristics of the midwife: (1) whether she attended a training course for midwives; (2) whether she received any formal education; and (3) her ethnicity (indigenous or ladino). The midwife's education may affect her overall exposure to and comfort with biomedical beliefs and providers, beyond her experiences in the short training program. Indigenous midwives may be less likely to make referrals than ladinas because of differences in health beliefs, cultural practices, and socioeconomic status, and because of discrimination towards indigenous patients and midwives at public health facilities (e.g., Cosminsky, 1982; Hurtado and Esquivel, 1986; Rosenthal, 1987; Schieber and Delgado, 1993).

An additional three variables reflect characteristics of the community: (1) whether a biomedical provider (e.g., health center or post, private doctor or nurse, or private clinic) is present within the community; (2) whether the community has regular bus transportation; and (3) the average household consumption per capita of the respondents living in the community – a proxy measure for the income level of the community.[17] The first of these variables encompasses women's access to biomedical providers and reflects the degree to which midwives may have been exposed to and influenced by biomedical beliefs and practices. Thus, the presence of a doctor or health center or post in the community should increase the likelihood that midwives make referrals. Midwives should also be more likely to make referrals in communities with adequate transportation systems in light of the remoteness of many of the biomedical providers and facilities (especially hospitals). Finally, the average income in the community (a continuous variable) may affect referrals to the extent that higher income serves as a proxy for contact with urban areas and exposure to and acceptability of Western ideas among the women and the midwife.

The odds ratios from the logistic model shown in Table 7 reveal that, in the presence of control variables, midwife training has a large and significant effect on referral practices: e.g., the odds of referring a pregnancy to a biomedical provider are 23 times as high for a trained as

[16] The few midwives (five percent) who refer women to other midwives also refer women to at least one type of biomedical provider or facility. Thus, for simplicity, we assume that midwives who report that they *frequently* or *always* make referrals to other providers do so with regard to a biomedical provider.

[17] The transportation variable denotes whether bus service was available during the five years prior to the survey and the principal road was open during the past year. The measure of per capita monthly household consumption is derived from women's reports regarding household consumption of 40 staples and food products bought, harvested, produced, or gathered in the week preceding the survey; it does not include less frequent expenses such as cosmetics, transportation, clothing, medical costs, and celebrations (Peterson et al., 1997). Consumption is a better indicator of overall resources than income because it is less subject to short-term fluctuations and is likely to be more accurate, especially in agricultural communities where food may be produced and consumed within the household (Deaton, 1989; Montgomery et al., 2000).

compared with an untrained midwife.[18] Surprisingly, however, the midwife's education has virtually no impact on the likelihood that she refers patients elsewhere. As hypothesized, indigenous midwives are (significantly) less likely to refer pregnant women. Although not significantly related to referral status, the effect of access to bus transportation is substantial and in the expected direction. Neither the presence of a biomedical provider nor the income level of the community is significantly related to referral practices.

Midwife Practices

Table 8a displays the distributions of responses by *midwives* to questions in the EGSF pertaining to the content of their practice. Table 8b, which is based on the sample of recent births for which women saw a midwife, considers *women's* responses to several questions pertaining to the content of the midwife's care.

With regard to the prenatal period, the estimates in Table 8a indicate that nearly all midwives routinely examine the position of the fetus and give advice about foods that the mother should or should not eat during pregnancy. Most midwives, at least on occasion, try to change the position of the baby and administer herbal remedies. Surprisingly, the traditional practice of massage is far from universally practiced, even though many ethnographic studies have stressed the importance and pervasiveness of this practice among midwives (Acevedo and Hurtado, 1997; Cosminsky, 1982; Greenberg, 1982; Lang and Elkin, 1997).[19]

The data also indicate that more than 60 percent of midwives have ever performed a vaginal exam and almost 40 percent do so routinely, a practice that is considered potentially harmful because of the risk of infection. Although very high, this estimate is lower than that obtained in a study in Santa María de Jesús in the Department of Sacatepéquez in the mid-1980s, in which three-quarters of women reported that midwives performed vaginal exams (Bartlett and Paz de Bocaletti, 1991). As shown in Table 8a, about 30 percent of midwives have taken a woman's blood pressure or pulse, or given injections of vitamins. Other biomedical treatments and practices – drawing blood (reported by the women), giving antibiotics, tetanus immunizations, or injections of medicine, and administering injections at the time of delivery – appear to be considerably less common among midwives.

Estimates for injections to speed delivery (presumably oxytocin) suggest a prevalence of 12 to 15 percent, based on the sample of midwives (Table 8a) and the sample of births (Table 8b) respectively. Although these values are noteworthy given the potential dangers to the infant and mother associated with this practice,[20] they are nevertheless lower than those from other studies. For example, data from a 1986 study in Santa María de Jesus indicate that intramuscular

[18] The much larger estimated (23) as compared with observed odds ratio (4) associated with training is largely due to the fact that trained midwives are more likely to be indigenous and less likely to have accessible transport, as compared with untrained midwives.

[19] It is possible that midwives may have underreported the practice of massage in the EGSF because the questionnaire used the word "masaje" rather than the more appropriate term "sobar." Because the provider interviews were administered only in Spanish, it is also possible that some indigenous midwives may not have understood the question.

[20] Intramuscular injection of oxytocin during labor is considered dangerous regardless of the provider administering the injection because the dose cannot be adapted as it can with intravenous administration (WHO, 1996).

injections of oxytocin were used in more than half of births (Bartlett and Paz de Bocaletti, 1991), and a study in Quetzaltenango (Schieber, 1992) reports that about 40 percent of midwives used these injections. The lower estimates from the EGSF may be a result of the exclusion of urban areas from the sample; use of oxytocin is thought to be highest in the highlands and in areas close to the major cities (Bartlett et al., 1993).

Several potentially harmful treatments pertaining to the time of delivery or shortly thereafter continue to be common. For example, almost a quarter of midwives routinely push on the abdominal area at the beginning of delivery and half of midwives normally put powder or ointments on the umbilical cord. Both of these procedures are considered dangerous, the former because of its association with uterine complications and the latter because of risk of infection or tetanus (Liskin, 1992; WHO, 1994; WHO, 1996). Most midwives (85 percent) routinely bind the woman's stomach after birth – a practice "condemned" by the training courses, although there is no scientific evidence that it is harmful. A much smaller proportion (about a third) prepare the traditional sweatbath (*temascal*). Previous largely ethnographic research has stressed the importance of the sweatbath, especially during the postpartum period and among the indigenous population (Cosminsky, forthcoming; Acevedo and Hurtado, 1997), although estimates of its prevalence have not been available. The data in Table 8a also reveal that midwives frequently tell mothers to supplement breastmilk in the first week of life,[21] presumably because the midwives believe that colostrum provides insufficient nutrition (Lang and Elkin, 1997). However, the biomedical literature suggests that early supplementation may interfere with the initiation or continuation of breastfeeding (Safe Motherhood, 1998). On the other hand, nearly all midwives report that they routinely perform practices that are beneficial: keeping the baby warm after birth, encouraging immediate breastfeeding, and encouraging immunization.

Quality of Care

Frequencies pertaining to the 10 midwife practices that we have classified as beneficial or harmful are shown in Table 9 and are derived from the data shown in the previous table. Beneficial practices have been coded in terms of midwives *failing to* perform the activity so that each frequency denotes the prevalence of a harmful practice. As noted earlier, the prevalence of these practices varies enormously from fewer than two percent of midwives failing to encourage immunization to three-quarters recommending supplementation of breastfeeding in the first week of life. As indicated by scores on the index of quality of care, most midwives perform between one and four of these harmful activities.

Trained midwives have almost identical scores as their untrained counterparts (2.58 as compared with 2.69, data not shown), a result that suggests that training has no effect on the prevalence of these harmful (or beneficial) practices. We confirm this finding by estimating a linear regression model in which the quality of care index is the outcome variable and all but one of the covariates from the referral model are included as explanatory variables. We exclude the

[21] As shown in Table 9, midwife reports indicate that about three-quarters of midwives normally tell the mother to give the baby sugar water or tea during the first week of life. According to mothers' reports for a sample of 3,211 breastfed infants, 39% of mothers give their infants sugar water or tea in the first week of life, and an additional 24% give the infant water, milk, formula, or something else.

availability of bus transportation, because this variable is less likely to be associated with the content or quality of care as compared with referrals of patients to another, potentially distant provider. Our rationale for including the remaining covariates is generally similar to that for referrals. In the case of the presence of a biomedical provider, we hypothesize that the presence of these providers may result in an informal monitoring of the midwives' practices, or at least a constraint on their behavior, as well as a decreased demand for the midwife to provide biomedical procedures that may be harmful when administered by an untrained midwife.

The coefficients from the multivariate regression, shown in Table 10, indicate that midwife training programs have had virtually no effect on the overall quality of midwife care. As in the case of referral practices, the effects of the midwife's education and the income level of the community are insignificant. However, the presence of a biomedical provider in the community is associated with higher quality of care (i.e., a lower score of harmful practices), while indigenous midwives appear to offer a lower quality of care than ladino midwives.

Discussion

This analysis has provided mixed findings regarding the efficacy of efforts aimed at integrating midwives into the formal health system. As suggested by earlier work, the training programs appear to be widespread: about three-quarters of midwives in our sample have attended such a course. However, in spite of these training courses, most pregnant women do not see a biomedical provider at any point during pregnancy. Previous research offers numerous reasons for women's low utilization of biomedical care, even when they are given a referral by a midwife: fear (of the treatments or the personnel), condescending attitudes of the providers, refusal by women's spouses, embarrassment, perceptions of poor quality of care, limited hours of service, language constraints, poor access to health facilities, and lack of resources (Cosminsky, 1982; Rosenthal, 1987; Hurtado and Saenz de Tejada, forthcoming). On the other hand, those who do combine care make several visits to the biomedical providers rather than the single visit suggested by some previous studies. The postpartum period appears to be a time when more women need to be examined – either by midwives or by biomedical providers – to detect any postpartum complications and to check on their infants' health status.

Consistent with the objectives of training programs, the majority of midwives do refer their patients to other providers for prenatal care and for problems. However, most do not do so on a regular basis. Nevertheless, the training programs appear to have had a substantial impact on the frequency of referrals, with trained midwives being much more likely to refer their patients than their untrained counterparts. The fact that most midwives – even trained midwives– do not regularly refer their clients is likely due to various factors described by Hurtado and Saenz de Tejada (forthcoming). For example, many of the midwives in their study reported being uncomfortable with the poor treatment they received from the staff at government health facilities. Moreover, fewer than half of the midwives had actually been to the hospital designated for their referrals and hence they felt uneasy about making referrals to a place they did not know.

A detailed examination of the contents of midwife care reveals that midwives continue to offer many traditional treatments although some may be less prevalent than in the past. For example, only about half of the midwives report that they routinely use abdominal massage – a

prevalence much lower than that implied by earlier ethnographic work. The use of the traditional sweatbath and herbal remedies may also be on the decline. Although the absence of time series data does not permit us to verify trends, midwife practices are probably becoming increasing biomedicalized as well. The EGSF data reveal that a large fraction of midwives have adopted biomedical practices such as performing vaginal exams and giving injections.

Medicalization of midwifery care is of particular concern to the extent that midwives adopt practices that are harmful or inappropriate given their training and setting. While some biomedical practices are probably beneficial even when used by an untrained midwife (e.g., giving vitamins) and others may be harmless at worst (e.g., taking blood pressure), some treatments are potentially dangerous to the pregnant woman and her unborn child. Even if training programs have achieved modest success in reducing the prevalence of traditional practices deemed harmful, this "positive" effect is likely to be offset by midwives' increasing exposure to biomedical treatments that require extensive training for appropriate use. Results from our statistical model of quality of care support this view. When measured in terms of 10 traditional and biomedical practices that we have identified as either beneficial or harmful, the training status of midwives reveals no association with the overall quality of care. This is not to say, of course, that the midwife training programs would not be more efficacious if they were to modify their teaching methods and course content in line with the many criticisms targeted at them.

A serious limitation of the present study is its one-sidedness: while providing an evaluation of midwife care, this investigation does not offer a corresponding assessment of biomedical pregnancy-related care. This is an unavoidable drawback, because the EGSF did not collect extensive information on the content of pregnancy care offered by government-sponsored health facilities and private doctors.

Nevertheless, the limited information that is available from the EGSF points to several serious problems associated with biomedical pregnancy care in Guatemala. First, interviews with personnel at health posts and centers substantiate findings from earlier studies regarding the widespread lack of resources. For example, almost half of the 48 facilities included in the survey lack fetal stethoscopes and a similar proportion lack iron supplements. Second, data from a qualitative study undertaken as part of this project document the lack of social support experienced by women during hospital births (Carter, 1999). Third, reports from women interviewed in the EGSF on the use of injections during pregnancy reveal that more than one-quarter of women who gave birth in hospitals did not know the purpose of the injection they received, in contrast to about five percent of women who gave birth at home. This finding suggests that hospital staff may fail to explain to women the nature of and risks associated with treatments that women receive. Apart from the EGSF, there is anecdotal evidence (e.g., from health providers and the media) that excessive interventions, such as high rates of cesarean delivery, are a problem in Guatemalan hospitals.

These limited depictions of biomedical care make it apparent that the successful integration of midwives into the formal health care system must involve more than the modification of midwife practices to make these practices consistent with biomedical standards. High quality pregnancy care must also entail the monitoring and modification of the practices of

biomedical providers that serve pregnant women to (1) guarantee respect for the woman and her family; (2) avoid conflict with social and cultural norms; and (3) ensure that treatments are based on scientific evidence rather than convention and convenience of the provider. The collection of detailed information on the content of pregnancy-related care offered by both traditional and biomedical providers would be an appropriate starting point for this herculean task.

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Table 1. Availability of Health Care Services

	In the community (%)	Within one hour (%)
Providers		
Midwife	96.7	100.0
Private Nurse That Serves Pregnant Women	6.7	8.3
Private Doctor That Serves Pregnant Women	21.7	53.3
Facilities		
Health Center or Post	41.7	88.3
IGSS[a] Clinic	1.7	28.3
Private Clinic	26.7	55.0
Government Hospital	0.0	25.0
Private Hospital	5.0	21.7
Any Biomedical Services	51.7	91.7
Total Number of Communities	60	

[a]IGSS stands for Instituto Guatemalteco de Seguridad Social (Guatemalan Institute of Social Security). IGSS generally serves industrial or plantation workers and is paid for by the national government and employers.
Source: Census of providers and facilities provided by key informants in the EGSF (1995).

Table 2. Cost of Health Care Services Related to Pregnancy

Midwives	(n=66)
Average Charged for Pregnancy and Delivery[a]	Q40
If Patient Has No Money:	
Accepts Payment in Kind (%)	77.3
Does Not Charge (%)	4.5
Private Doctors	(n=26)
Average Charge for Prenatal Exam[b]	Q16
Average Charge for Delivery[c]	Q350
If Patient Has No Money:	
Accepts Payment in Kind (%)	19.2
Does Not Charge (%)	57.7

[a]Two midwives report the charge per visit and are excluded from the calculation of charges for pregnancy and delivery.
[b]One doctor did not report charges for prenatal exams and is excluded from the descriptive statistics.
[c]Only 13 doctors offer delivery care. Average charges are based on these 13 providers.
Note: At the time of the survey, one *quetzal* (Q) was worth about 20 cents U.S.
Source: Provider interviews in the EGSF (1995).

Table 3. Characteristics of Midwives

Formal Training	
Attended Course for Midwives or related to Pregnancy/Delivery (%)	75.8
Attended Some Other Course[a] (%)	15.2
Has Not Attended Any Course (%)	9.1
How Learned to Attend Pregnant Women	
Experience/Necessity (%)	37.9
Divine Calling (%)	36.4
Course or Practicum (%)	15.1
Apprenticeship (%)	9.1
Formal Education	
Any Formal Schooling (%)	30.3
Mean Number Years Schooling Among Those with Any Schooling	3.6
Ethnicity and Language Ability	
Ladino/Speaks Spanish (%)	35.4
Indigenous/Speaks Both Spanish and Maya Language (%)	38.5
Indigenous/Speaks Only Maya (%)	15.4
Indigenous Speaks Only Spanish (%)	10.8
Provider Roles	
Midwife Only (%)	65.2
Midwife/Curer (%)	18.2
Midwife/Curer/Other[b] (%)	7.6
Midwife/Other[b] (%)	9.1
Majority of Clients are:	
Relatives (%)	1.5
Not Relatives (%)	86.4
Half and Half (%)	12.1
Hours Spent Treating Pregnancy Women and Sick People in Past 7 Days (mean)	10.2
Number Deliveries in Past 2 Weeks (mean)	2.2
Number of Midwives	66

[a]Other courses included: post-partum baby care, maternal and child health courses, APROFAM (family planning) courses, auxiliary nursing, health promoter, dehydration and prevention of illness, community health, and personal hygiene and importance of vaccination.
[b]Other roles include herbalist, bonesetter, masseuse, injectionist, nurse, and health promoter.
Source: Midwife interviews in the EGSF (1995).

Table 4. Care During Pregnancy, Delivery, and the Postpartum period

	Percent
Providers Seen During Pregnancy	
No provider [a]	4.2
Traditional Only	
Midwife	56.3
Combined Care	
Midwife & Health Center or Post (HCP)	18.6
Midwife & Doctor/nurse	7.8
Midwife, HCP, and Doctor/nurse	1.7
Biomedical Only	
HCP	5.3
Doctor/nurse and HCP	0.6
Doctor/nurse	5.5
Place of Delivery	
Home[b]	85.4
Hospital/Clinic/HCP[c]	14.3
Other	0.3
Birth Attendant	
Midwife	80.9
Doctor	11.1
Nurse	3.5
HCP Staff	0.9
Other/No Attendant	3.6
Providers Mother Saw During Postpartum Period	
No Provider[a]	28.9
Traditional Only	
Midwife	59.3
Combined Care	
Midwife & Health Center or Post (HCP)	0.6
Midwife & Doctor/nurse	0.6
Biomedical Only	
HCP	1.9
Doctor/nurse and HCP	0.0
Doctor/nurse	8.7
Providers Baby Saw During Postpartum Period	
No Provider[a]	28.4
Traditional Only	
Midwife	55.1
Combined Care	
Midwife & Health Center or Post (HCP)	1.2
Midwife & Doctor/nurse	0.7
Midwife, HCP, and Doctor/nurse	
Biomedical Only	
HCP	4.5
Doctor/nurse and HCP	0.1
Doctor/nurse	10.1
Number of births	3,350

[a]Among those births where no provider was seen, another person was consulted (i.e. family member, curer, injectionist, pharmacist, neighbor) in some cases (6 for prenatal check, 12 for postpartum check of mother, and 19 for postpartum check of baby).
[b]97% of home births occurred in the respondent's home.
[c]83% of births in a medical facility occurred in the hospital, 14% in a clinic, and 3% in an HCP.
Source: Mother interviews in the EGSF (1995).

Table 5. Mean Number of Visits to Providers During Pregnancy, by Combination of Providers Seen

Among Those Who Saw a Provider During Pregnancy	Total	Traditional	Combined Care			Biomedical		
		Midwife Only	Midwife & HCP	Midwife & HCP & Doctor/Nurse	Midwife & Doctor/Nurse	HCP Only	Doctor/Nurse & HCP	Doctor/Nurse Only
Mean Number of Visits to:								
Midwife	5.7	6.6	6.4	5.8	6.0		na	na
HCP	1.3	na	4.5	3.8	na	5.4	4.2	na
Doctor/Nurse	0.8	na	na	3.9	4.0		4.2	6.3
All Providers[a]	7.8	6.7	10.9	13.6	10.0	5.4	8.5	6.3
Number of Births	3,165	1,855	616	56	257	178	21	182

HCP = Health Center or Post
na = Not applicable
[a]Includes visits to other providers.
Source: Mother interviews in the EGSF (1995).

Table 6. Referrals by Midwives to Other Providers During Pregnancy and Delivery

	Percent
How Often Refers to Another Provider	
Always	24
Frequently	8
Sometimes	42
Almost Never	6
Never	20
For Problems During Pregnancy, Ever Refers Women to:	
Any Provider	80
Health Center or Post	64
Private Doctor	24
Hospital	27
Another Midwife	5
For Problems During Delivery, Ever Refers Women to:	
Any Provider	77
Health Center or Post	26
Private Doctor	9
Hospital	53
Number of Midwives	66

Source: Midwife interviews in the EGSF (1995).

Table 7. Odds Ratios from Logit Regression Model Predicting Likelihood that Midwife Frequently or Always Refers Clients to a Biomedical Provider

Variable	Odds Ratio	P value
Trained Midwife	23.33*	0.01
Any Formal Education	1.01	0.99
Indigenous	0.06*	0.03
Any Biomedical Services in the Community	1.60	0.54
Average Per Capita HH Consumption in the Community	0.91	0.21
Bus Transportation Available and Principal Road Open Year-Round	3.79	0.13
Number of Midwives	66	

* $p < 0.05$

Note: Model includes set of dummy variables for department of residence.

Table 8. Treatments and Practices Given by Midwives According to Midwife and Mother Reports

Table 8a. Midwife Reports

	Percent Distribution			
Do you ___ normally, once in a while, or never?	**Normally**	**Once in a while**	**When Needed**	**Never**
Examine Position of the Baby	94	4	0	2
Give Advice About Food	97	0	0	3
Give Abdominal Massage During Pregnancy	51	4	17	27
Give Other Massage During Pregnancy	17	9	17	58
Try to Change the Position of the Baby	20	9	42	29
Take Woman's Pulse or Blood Pressure	26	3	0	71
Do a Vaginal Exam	38	8	18	36
Say a Special Prayer for the Mother's Health	85	2	0	14
Conduct Religious/Spiritual Ceremony	21	6	3	70
Push on the Stomach at the Beginning of Birth	23	3	12	62
Clean the Baby After Birth	100	0	0	0
Keep the Baby Warm After Birth	89	2	2	8
Tell Mother NOT to Breastfeed 1st few days	3	0	2	95
Tell Mother to Immediately Breastfeed	97	2	0	2
Put Powders/Ointments on the Umbilical Cord	50	0	4	46
Prepare Steambath After Birth	35	0	5	60
Bind the Mother's Stomach	85	6	5	4
Tell Mother to Give Baby Sugar Water 1st Week	65	9	5	21
Tell Mother to Give Chicory/Anise Tea 1st week	51	6	11	32
Recommend Immunize Children	98	0	0	2
Recommend Not Immunize Children	4	0	0	96
Check on the Woman in the 40 Days After Birth	71	3	6	20
Check on the Baby in the 40 Days After Birth	74	2	3	21
How often do you give the following to pregnant women or to women during delivery?	**Almost Always**	**Generally**	**Sometimes**	**Never**
Herbs or Herb Teas	21	29	21	29
Vitamins	20	21	11	48
Injections of Vitamins	11	12	6	71
Aspirin	2	2	3	94
Antibiotics	0	0	4	96
Injections of Medicine	2	3	6	89
Injections Against Tetanus	4	5	0	91
Injections to Alleviate Delivery Pains	4	2	5	89
Injections to Speed Delivery	2	2	9	88
Number of Midwives		66		

Source: Midwife interviews in the EGSF (1995).

Table 8b. Mother Reports

During the Pregnancy, Did Midwife	**Percent**	**During the Birth, Did Midwife:**	**Percent**
Check the Position of the Baby	98.7	Give Mother Any Injection	17.9
Take Blood Pressure	32.2	Give Injection to Deliver More Quickly[a]	14.8
Take Blood	0.6	Give Injection to Reduce the Pain[a]	1.5
Give an Injection	8.0	Give Injection for Another Purpose[a]	0.7
Give a Prescription, Medicine, or Remedy	19.5	Give Injection of Unknown Purpose[a]	1.0
(n=2,891 births)		(n=2,706 births)	

[a]The respondent was allowed to report more than one purpose of the injection.

Source: Mother interviews in the EGSF (1995).

Table 9. Distribution of Quality of Care Index

Individual Items in Index	Percent
Ever Give Injection to Speed Delivery	12.1
Ever Give Antibiotics	4.5
Ever Put Powder or Ointment on the Umbilical Cord	54.5
Normally Push on Stomach at Beginning of Delivery	23.1
Normally Perform Vaginal Exam	37.9
Normally Tell Mother to Give Baby Sugar Water/Tea	75.8
Do Not Normally Keep the Baby Warm after Birth	10.6
Do Not Normally Encourage Breastfeeding	3.0
Do Not Normally Encourage Immunization	1.5
Do Not Normally Check Mother and Baby Postpartum	32.3

Score on Index[a]	N	Percent
Zero	1	1.6
One	13	20.3
Two	16	25.0
Three	18	28.1
Four	12	18.8
Five	4	6.3

[a]On this index, a high score indicates greater use of potentially harmful practices (maximum possible score = 10).
Note: Two midwives have missing values on the index.
Source: Midwife interviews in the EGSF (1995).

Table 10. Coefficients from Linear Regression Model Predicting Score on Quality of Care Index[a]

Variable	Coefficient	P value
Intercept	1.61	
Trained Midwife	-0.27	0.460
Any Formal Education	-0.43	0.231
Indigenous	1.13*	0.045
Any Biomedical Services in the Community	-0.74*	0.029
Average Per Capita HH Consumption in the Community	0.05	0.134
Number of Midwives	64	
R^2	0.22	
Adjusted R^2	0.11	

* $p < 0.05$
[a]On this index, a high score indicates greater use of potentially harmful practices.
Note: Model includes set of dummy variables for department of residence.